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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Anke Althoff

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EXAMINER

KEMMERLE III, RUSSELL J

ART UNIT

PAPER NUMBER

1791

NOTIFICATION DATE

DELIVERY MODE

08/20/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No. 10/523,345	Applicant(s) ALTHOFF ET AL.	
	Examiner RUSSELL J. KEMMERLE III	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5 and 7-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5 and 7-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

Claims 1-3, 5 and 7-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This rejection is maintained from the previous Office action. Since previous claim 6 has now been amended in to claim 1, the previous rejection of claim 6 under 35 USC §112, first paragraph, is now applied to claim 1.

Claims 2, 3, 5 and 7-13 are rejected based on their dependence from claim 1.

Claim Rejections - 35 USC § 103

Claims 1, 2, 5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herron (US Patent 4,627,160).

Herron discloses a method of making a laminated ceramic substrate where a plurality of ceramic green sheets are laminated together, and subsequently fired. Herron discloses that the firing process involves several heating steps, including preheating to 200°C in a nitrogen environment, further heating to 450°C in a hydrogen/water environment, continuing to 785°C, and finally sintering in a nitrogen environment at 965°C to sinter the substrates (see Examples I and II, Col 5 line 51 –

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Col 6 line 68). Herron specifically states that in heating to the sintering temperature there is no prior cooling of the sample (Col 6 lines 55-57). It should be noted that all heating steps described above are carried out in an inert atmosphere. Herron further discloses that this heating cycle is effective where the layers of the ceramic substrate are made of different ceramic materials (see, Example 1, Col 5 line 51-Col 6 line 46, specifically Col 6 lines 16-22).

While Heron does not disclose the relative permittivities of the materials used, it would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to use materials which satisfy the permittivity limitations of claims 1 and 6 in order to form a laminated ceramic substrate since the relative permittivities of the materials used is known to effect how well they operate as an insulator in the structure. The optimization of the permittivities in order to create a substrate having the desired level of insulation between layers would have been well within the ability of one of ordinary skill in the art, and would have had the predictable result of adjusting the insulating characteristics of the finished substrate (see Benumof, Reuben. Concepts in Electricity and Magnetism. New York:Holt, Rinehard and Winston, 1961. 82-85, 100. discussing permittivity as being defined and measured by the capacitance of that material between two charged plates which is dependant on how well that material acts as an insulator). “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and

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an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.); See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).

Referring to claim 2, Herron further discloses that in forming the laminated stack via holes are opened in the ceramic green sheets, and that those holes are filled with an electrically conductive (i.e., metalliferous) paste, and that the paste is also used to form line patterns on the surface of the sheets (Claim 15).

It would be inherent that these layers would possess the relative sintering temperatures as recited in claim 5.

Referring to claims 7 and 8, Herron discloses that between these stratified layers, a metallization layer (i.e., an in line pattern) can be formed (see Claim 15).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herron in view of Nakatani (US Patent 5,252,519).

Herron is relied upon as discussed above, specifically with reference to claim 2. Herron further teaches that the electrically conductive paste to be used be a copper compound, and does not teach the use of a silver or silver-palladium containing paste.

Nakatani discloses a method for making a stacked ceramic substrate substantially similar to that of Herron. Nakatani discloses that the metal conductor paste used could include, among others, a silver-palladium mixture (Col 1 lines 26-28).

It would have been obvious to one of ordinary skill in the art, at the time of invention by applicant to have modified the method of Herron by using a silver-palladium paste as the metallic conductor as taught by Nakatani instead of the copper compound taught by Herron. This would have been obvious because Nakatani discloses that such a paste is effective as a material for such use, and the advantageous electrical properties of silver-palladium are well known to those in the art.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herron in view of Harada (US Published Application 2001/0,022,416)

Herron is relied upon as discussed above but does not teach that the heating process occurs in air.

Harada discloses a method of making a ceramic substrate, substantially similar to that of Herron. Harada further teaches that the heating processes for debinding and sintering are carried out in air (Page 3 paragraph 45) (it is assumed that since no firing environment is described that an air environment is used, since any other special environment would be affirmatively disclosed).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the method taught by Herron of firing the ceramic substrate in an inert environment by firing in air as taught by Harada. This would be obvious because Harada discloses that such an environment is effective for firing, and an air environment is cheaper and easier to achieve than an inert environment since nothing has to be added to the firing environment.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable Herron in view of Harada and Tamhankar (US Patent 5,230,846)

Herron and Harada are relied upon as discussed above, but fail to teach that during debinding the environment is switched from inert to air (specifically the special case as recited in claim 13, or the firing cycle recited in claim 12).

Herron discloses the benefits of debinding in an inert environment, while Harada discloses the benefits of sintering in an air environment (as discussed above). However, they do not discuss starting with an inert environment of Herron, and switching to the air environment of Harada, specifically performing this switch during a reduction in the temperature from the maximum debinding temperature to a lower temperature that is equal to or greater than the starting debinding temperature.

Tamhankar discloses a method of firing a ceramic substrate substantially similar to that of Herron and Harada. Tamhankar discloses that during the firing cycle a first temperature is reached where debinding begins (T_{E1} , around 200°C), firing and debinding is then continued up to 500°C in a nitrogen/oxygen/water vapor environment. After a hold at 500°C (T_{E2}), the temperature is reduced to 485°C ($T_{E1'}$) while the firing environment is changed, during this time the environment is nitrogen/hydrogen/water vapor. Firing is then continued (with the temperature never dropping below T_{E1} , 200°C) to a sintering temperature in a nitrogen/water vapor environment (Fig 1).

It would have been obvious to one of ordinary skill in the art to modify the method taught by Herron of firing in an inert environment, by changing the environment after debinding to an air environment, since as taught by Harada an inert environment is not

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required after the debinding is completed and an air environment would be cheaper and easier to fire it. It would be further obvious that the change in environment could be accomplished by the method taught by Tamhankar, which teaches an effective method of transitioning from one environment to another during firing without a substantial reduction in temperature at any point during the firing cycle.

Response to Arguments

Applicant's arguments filed 21 April 2009 have been fully considered but they are not persuasive.

Applicants first assert that one skilled in the art would have understood how to manufacture a K20 material at the time the current application was filed.

This is not found persuasive because Applicants have not provided any evidence that one skilled in the art would have been able to do this, and have not provided any material or composition which meets this range, or evidence that such a material or composition was known at the time this application was filed.

Applicants further argue that the recited permittivity limitations would not have been obvious as the prior art is silent as to permittivity.

This is not found to be persuasive because, as discussed in the previous Office action and above, permittivity is known to have an effect on the properties of such a device (i.e., it is a result effective variable). Normally, the optimization of result effective variables is obvious absent some showing of why it wouldn't be (such as secondary considerations). Since no such evidence has been provided, the rejection is maintained.

Applicants finally point out the apparent contradiction between rejecting the claims under 35 USC §112, first paragraph, and 35 USC §103(a) as obvious over what would have been obvious to one of ordinary skill in the art.

The rejections do not depend on or rely on each other, and each stands on its own. In the interest of compact prosecution all potential rejections are presented in the same Office action, instead of placing each in a subsequent action. Further, this position does not appear to be any more contradictory than Applicants' position that one skilled in the art would have known how to make a K20 material but that such a material would have been novel and non-obvious.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **RUSSELL J. KEMMERLE III** whose telephone number

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is (571)272-6509. The examiner can normally be reached on Monday through Thursday, 7:00-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Carlos Lopez/
Primary Examiner, Art Unit 1791
/R. J. K./
Examiner, Art Unit 1791